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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/751,955

12/29/2000

Pamela A. Binns

H16-25538

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12/12/2005

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EXAMINER

SHAH, NILESH R

ART UNIT

PAPER NUMBER

2195

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/751,955	<b>Applicant(s)</b> BINNS, PAMELA A.	
	<b>Examiner</b> Nilesh Shah	<b>Art Unit</b> 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

### DETAILED ACTION

1. Claims 1-38 are presented for examination.

#### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1- 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Lehoczy et al (“Scheduling periodic and aperiodic tasks using the slack stealing algorithm”)

4. Lehoczy et al was cited in IDS files on 5/13/04.

5. As per claim 1 Lehoczy teaches the invention as claimed including a multitasking system executing real-time harmonic and dynamic tasks that can request activation or deactivation at any time, a method of scheduling tasks comprising (page 184, section 8.3.3 lines 5-32; page 187, section 8.4 lines 20-37);  
assigning priority levels to tasks (page 183, section 8.3.2 lines 2-15;)

determining available slack for tasks at each priority level (page 178, section 8.3; table 8.2; page 179, section 8.3.1 lines 25-40; page 183, section 8.3.2 lines 37-40);

and

allocating slack to tasks in order of priority (page 183, section 8.3.2 lines 2-15; page 185, section 8.3.3 lines 25-45).

6. As per claim 2, Lechoczky teaches a method wherein tasks are scheduled according to a rate monotonic algorithm (page 172 section 8.1).
7. As per claim 3, Lechoczky teaches a method wherein a periodic high priority task can steal slack from available slack without impacting an execution deadline of a periodic low priority task (page 183, section 8.3.2 lines 2-15; page 185, section 8.3.3 lines 25-45).
8. As per claim 4, Lechoczky teaches a method wherein determining available slack comprises:
  - determining slack consumed (page 184, section 8.3.3 lines 5-32; page 187, section 8.4 lines 20-37);
  - determining timeline slack (page 2 lines 45-47, page 4 lines 19, 23-24, 36-37);
  - determining reclaimed slack (page 183, section 8.3.2 lines 2-15) and
  - determining idle time (page 183, section 8.3.2 lines 2-15; section 8.3.3 lines 25-45).

9. As per claim 5, Lechoczky teaches a method wherein determining timeline slack comprises maintaining a table that is recalculated (page 183, section 8.3.2 lines 2-15).
10. As per claim 6, Lechoczky teaches a method wherein determining available slack comprises maintaining accumulators for slack consumed, reclaimed slack, and idle time (page 2 lines 45-47, page 4 lines 19, 23-24, 36-37).
11. As per claim 7 Lechoczky teaches a method wherein tasks have periods, and wherein maintaining the accumulators comprises updating the accumulators upon the occurrence of an event from the group consisting of when crossing a period boundary (page 184, section 8.3.3 lines 5-32; page 187, section 8.4 lines 20-37);  
when a task completes for period when executing on a fixed budget with slack to be reclaimed (page 184, section 8.3.3 lines 5-32; page 187, section 8.4 lines 20-37);  
when a processor executing the tasks transitions from idle to busy (page 183, section 8.3.2 lines 2-15);  
when a task completes for period when executing on slack (page 178, section 8.3; table 8.2; page 179, section 8.3.1 lines 25-40; page 183, section 8.3.2 lines 37-40); and  
prior to calculating available slack for a new slack-consuming task (page 183, section 8.3.2 lines 2-15; section 8.3.3 lines 25-45).

12. As per claim 8, Lechoczky teaches a method wherein determining available slack comprises predecrementing accumulators to allow for overhead associated with allocating slack (page 183, section 8.3.2 lines 2-15; page 185, section 8.3.3 lines 25-45).
13. As per claim 9, Lechoczky teaches a computer system used for multitasking (page 178, section 8.3; table 8.2; page 179, section 8.3.1 lines 25-40; page 183, section 8.3.2 lines 37-40). It is inherent that the computer system can be used in a flight control system.
14. Claim 10 is rejected based on same rejections as stated in claim 1 above.
15. Claims 11-19 are rejected based on same rejections as stated in claims 1-9 respectfully.
16. Claim 20 is rejected based on same rejections as stated in claims 1 and 4 above.
17. Claims 21-28 are rejected based on same rejections as stated in claims 1, 4, 2, 5-9 respectfully.
18. Claims 29-37 are rejected based on same rejections as stated in claims 1-9 respectfully.
19. As per claim 38, Lechoczky teaches a method wherein the multitasking system is a real-time control system (page 178, section 8.3; table 8.2; page 179, section 8.3.1 lines 25-40; page 183, section 8.3.2 lines 37-40).

***Claim Rejections - 35 USC § 103***

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
  - a. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the

prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. Claims 1- 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biliris et al (6,041,354)(hereinafter Biliris) in view of Turner et al (6,505,229) (hereinafter Turner).

22. As per claim 1 Biliris teaches the invention substantially as claimed including a multitasking system executing real-time harmonic and dynamic tasks (col. 8 lines 13-19; col. 3 lines 40-47), a method of scheduling tasks comprising determining available slack for tasks at each priority level (col. 10 lines 40-48; col. 11 lines 55-65; col. 13 lines 10-17); and assigning priority levels to tasks (col. 5 lines 47-59; col. 11 lines 14-25).

23. Biliris does not specifically teach the determining step taking into account a task that is inactivating.

Turner teaches the use of taking into account tasks that are activating and inactivating (col. 4 lines 1-6; col. 8 lines 34-45).

24. It would have been obvious to one skilled in the art at the time of the invention to combine the teachings of Biliris and Turner to ensure that a task can be activated or deactivated at anytime. By being able to activated or deactivated a task the user can determine and use excess slack thus making the entire system more efficient.

25. As per claim 2, Biliris teaches a method wherein tasks are scheduled according to a rate monotonic algorithm (col. 9 lines 6-22; col. 6 lines 9-19.)
26. As per claim 3 Biliris teaches a method wherein a periodic high priority task can steal slack from available slack without impacting an execution deadline of a periodic low priority task (col. 10 lines 40-48; col. 11 lines 55-65; col. 13 lines 10-17).
27. As per claim 4, Biliris teaches a method wherein determining available slack comprises:  
determining slack consumed (col. 11 lines 37-67; col. 8 lines 13-19; col. 3 lines 40-47);  
determining timeline slack (col. 10 lines 40-48; col. 11 lines 55-65; col. 13 lines 10-17);  
determining reclaimed slack (col. 11 lines 37-67; col. 13 lines 10-17); and  
determining idle time (col. 5 lines 47-59; col. 11 lines 14-25).
28. As per claim 5, Biliris teaches a method wherein determining timeline slack comprises maintaining a table that is recalculated (col. 8 lines 13-19; col. 3 lines 40-47).
29. As per claim 6, Biliris teaches a method wherein determining available slack comprises maintaining accumulators for slack consumed, reclaimed slack, and idle time (col. 10 lines 40-48; col. 11 lines 55-65; col. 13 lines 10-17).
30. As per claim 7, Biliris teaches a method wherein tasks have periods, and wherein maintaining the accumulators comprises updating the accumulators upon the occurrence



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of an event from the group consisting of when crossing a period boundary (col. 11 lines 37-67; col. 8 lines 13-19; col. 3 lines 40-47);

when a task completes for period when executing on a fixed budget with slack to be reclaimed (col. 10 lines 40-48; col. 11 lines 55-65; col. 13 lines 10-17);

when a processor executing the tasks transitions from idle to busy (col. 5 lines 47-59; col. 11 lines 14-25); and

when a task completes for period when executing on slack (col. 11 lines 37-67; col. 13 lines 10-17).

prior to calculating available slack for a new slack-consuming task (col. 8 lines 13-19; col. 3 lines 40-47),

31. As per claim 8, Biliris teaches a method wherein determining available slack comprises predecrementing accumulators to allow for overhead associated with allocating slack (col. 10 lines 40-48; col. 11 lines 55-65; col. 13 lines 10-17).

32. As per claim 9, Biliris teaches a computer system used for multitasking (col. 8 lines 13-19; col. 3 lines 40-47), It is inherent that the computer system can be used in a flight control system.

33. Claim 10 is rejected based on same rejections as stated in claim 1 above.

34. Claims 11-19 are rejected based on same rejections as stated in claims 1-9 respectfully.

35. Claim 20 is rejected based on same rejections as stated in claims 1 and 4 above.

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36. Claims 21-28 are rejected based on same rejections as stated in claims 1, 4, 2, 5-9 respectfully.
37. Claims 29-37 are rejected based on same rejections as stated in claims 1-9 respectfully.
38. As per claim 38, Biliris teaches a method wherein the multitasking system is a real-time control system (col. 8 lines 10-16).

### ***Response to Arguments***

39. Applicant's arguments filed 9/29/05 have been fully considered but they are not persuasive.
40. In remarks applicants argues that the prior art cited does not teaches the claim limitations however applicant does not state specific limitations that are not met by cited references. Examiner has provided two different rejections for claims 1-38 with specific sections of the prior art identified. Applicant must discuss the references applied against the claims, explaining how the claims avoid the references or distinguish from them.

### ***Conclusion***

41. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

42. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nilesh R Shah whose telephone number is 703-305-8105.

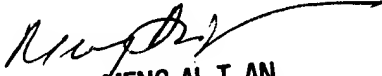
The examiner can normally be reached on Monday-Friday 8am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng An can be reached on 703-305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nilesh Shah  
Examiner  
Art unit 2195

NS  
December 1, 2005

  
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